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# NEW ORLEANS EXPERIENCE WITH COMPOUND METERS[1]

By George G. Earl[2]

Experience at New Orleans clearly proves that properly constructed compound meters will, in most cases, record a much larger percentage of the flow through them than any simple meter can possibly record. Experience here also shows that time and money spent in maintaining the meters of large paying[3] consumers in a condition to record accurately the water used by these consumers are well expended The character of service which is expected by the occupants of a large building varies greatly. If flushometer valves are used, the piping must be large and consequently the meters must be large, or there will be occasions when the great volumes of water suddenly demanded cannot be delivered. If there are many baths which the occupants expect to fill rapidly, the piping must be large and the meter also, and if the piping must furnish useful fire streams on occasion, it must be still larger and have larger meters. But these heavy demands, for which large discharge capacity of piping and meters must be provided, are occasional and the average rate of flow is small. The range in the rate of flow is beyond the range of accurate registration of a simple meter, and the compound meter must be used, or the water company or department will have no record of the small flows, which make up a large total for the quarter year.

The Sewerage and Water Board of New Orleans has various types of large compound meters. It was found during the early use of these types that each had a special field where it was most satisfactory, and that no one type was wholly satisfactory for each and every class of service and location. The Board's engineers accordingly designed a compound meter which has been installed exclusively during the last nine years on all connections over 2 inches in size, with most satisfactory results.

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[1] Presented at the Montreal Convention, June 24, 1920. Discussion is invited and should be sent to the Editor.

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[3] There are some large consumers which do not pay for water, but their supplies are metered. These large consumers need not have their supplies recorded so accurately as those of the large paying consumers, although it is desirable, of course, to have every use of water measured with fair accuracy.

This compound meter consists of a 6-inch main valve, held closed by a small differential piston until there is a loss of pressure of about 5 per cent on the two sides of the gate, and two metered passages by-passing the main valves. When the main valve is closed, any water drawn by the consumer must pass through one of the by-passes in which there is a 1-inch meter offering a small resistance to flow. The main valve rotates on a sleeve around a hollow stem which has a solid central division forming a double Corliss valve; the metered by-passes discharge into opposite ends of this hollow stem. So long as the main valve is closed, one by-pass discharges through a large number of very narrow slots in one side of the hollow stem and sleeve to the discharge side of the main valve. When the latter begins to open, these slots are instantly closed and a triangular slot on the opposite side of the hollow stem begins to open and admit a flow, proportional to the discharge of the main valve, to pass through the second by-pass which has a meter of the same size and construction used on the first by-pass. The two meter dials are graduated to show the actual flow, so the sum of the readings of the two gives the total flow which has passed through the compound meter.

The Sewerage and Water Board is making about fifty of these meters each year for its own use. The parts are interchangeable. They can be assembled rapidly and adjusted as required for use. Such a meter can be used on any size of connection from 4 to 12 inches, inclusive, and will pass without injury any object which can go through a 6-inch opening.

One of these meters will not cause a drop of more than 5 per cent in the pressure on its inlet side until the flow is excessive for a short 6-inch connection or even for a 12-inch connection of moderate length. They have been found to operate equally well on every kind of service, including fire protection, railway standpipe and hydraulic elevator. They do as well where there is water hammer and intermittent demands for all the water the pipes will deliver as on general service with a fluctuating daily draft and only leakage to be recorded at night.

This type of compound meter records accurately any flow from a fraction of a gallon per minute to the full capacity of the pipe. It is as accurate on decreasing as on increasing rates of flow. The "change-over point" from a flow through the by-pass to a flow through the main valve is made instantly at a low rate of flow without danger of under-recording when the shift is made.

Such a meter can be passed through a 22-inch circular manhole cover, so the work of installation or removal is simple. There are checks which prevent back-flow toward the street main or the meters on the two by-passes. There are valves which permit the removal or exchange of either of the meters on the by-passes without interrupting the supply.

At this time, with such meters on practically all large connections for paying consumers, it is believed that the only under-recording of the water supplied through such services is the flow which will not be recorded on an unusually delicate 1-inch disk meter. This is insignificant compared with any ordinary consumption, although more than can be afforded on a fire-protection connection with zero nominal consumption and nearly zero service charge.

The various types of large meters bought by the Board prior to 1911 are now mostly on the services of consumers who receive free water. These are known to under-record small flows. There is also a very large total amount of unrecorded water which passes in very small quantities through the small meters on domestic services. This feature of metering in New Orleans is now considered more important than further improvement in the measurement of the supplies of large consumers.